CS321: Numerical Methods in Comp Mol Bio

Homework 4

Due: Thursday, Sept 22 2005 at the begining of the section

Problem 1

Let X be a Uniform random variable on the interval (0,10).
Find the mean and variance of X.
Calculate the following probabilities:
$P(|X-5| \geq 2)$
$P(|X-5| \geq 4)$
$P(|X-5| \geq 5)$
Using the Chebyshev's inequality find an upper bound for the above probabilities.

Problem 2

Let X be an Exponential random variable with $\lambda = 1$, i.e. $f_X(x) = \begin{cases} e^{-x} & x \geq 0 \\ 0 & otherwise \end{cases}$

Find the mean and variance of X.
Use Markov's inequality to bound $P(X \geq 3)$.
Use Chebyshev's inequality to bound $P(X \geq 3)$.
Calculate the actual value of $P(X \geq 3)$.